

## Water Conservation Center Links Student Research and Community

One of the most cherished features of Las Vegas is the beauty of the dry Southwestern scenery. The sparse croppings of indigenous plants, the springtime desert bloom, and the sandy palette of hills and buttes have inspired generations who have celebrated this natural splendor for—and in spite of—its one shortcoming: A limited amount of readily accessible water.

UNLV's Center for Water Conservation, led by Dale Devitt, Ph.D., focuses its efforts to balance the strains of a growing urban desert community with what is often touted as the world's most precious natural resource. Undergraduate and graduate students work with Devitt on applied research projects throughout the state to improve water-use efficiency.

Brian Bird, now a master's student concentrating in water resource management, had an opportunity to work as part of Devitt's field team as an undergraduate. The team installed a system that measured wind direction and gases in Spring Valley; the project was critical to estimating the energy balance of desert plant communities.

"The field experience I gained has helped me to quickly troubleshoot computer and field problems," he says. "We traveled to a remote location and worked with a team of soil scientists to solve a common problem."

One of the center's recent projects studies the use of a shallow saline aquifer—water sitting about 40 feet below the ground—as an alternative water source for landscaping. Devitt and his student researchers monitored how turf grass at the UNLV football field and Valley High School's soccer field responded to this type of irrigation. While their study monitored the short- and long-term impact on the grass and soil, it also assessed economic and logistical considerations of using this non-traditional water source.

"Future growth and development in the valley—and even the quality of life for residents—will be impacted by how well existing water resources are managed," explains Devitt.

The Las Vegas Valley Water District estimates that residential customers use as much as 59 percent of Southern Nevada's drinking water; of that, nearly 70 percent is used outside. The center has also helped local efforts to identify and



**Brian Bird and Adam Rivera participate in field research associated with the Center for Water Conservation.**

quantify water-saving strategies that residents and businesses can employ to conserve water in their landscaping.

"Our local water district is very progressive," says Devitt, whose partnership with the water authority goes back nearly two decades. "However, from a water conservation perspective, it is extremely difficult to keep up with the growth in Las Vegas. More innovative ways to conserve water will be needed."

Devitt's team also works to implement computer engineering advances in satellite technology into water conservation. Working with a local golf course, team members are tracking a lawn mower with a specially-fitted global positioning system (GPS) and spectral reflectometer (which assesses how the sun's energy is reflected by plants) to collect data from designated patches of grass, each with a different treatment imposed. They hope to discover how different polymers, nitrogen, growth inhibitors, and even cutting heights have on the turf's growth and ability to withstand drought conditions. Devitt believes that the results could benefit resort destinations throughout the Southwest by decreasing irrigation requirements and operational

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# Letter from the Dean



**Ronald Yasbin,  
Dean,  
College of Sciences**

Dear Alumni and Friends,

Let me extend a warm welcome and thanks to you for reading the first issue of our College of Sciences newsletter. I want to use this publication to keep you informed on the activities and programs underway in the college. I hope that our many alumni and friends will help us by sending in personal and professional information on their activities as well as ideas and suggestions for news you would like to see. You will find a form within

each issue to help you keep us updated.

For the past two years I have worked with UNLV President Carol C. Harter and our faculty to enhance and expand teaching and research programs in the College of Sciences. The impressive ability of our faculty to obtain federal grant support for research in biological sciences, chemistry, geosciences, mathematical sciences, and physics demonstrates our maturation as a research university. Our faculty and students are vital, integrated partners in the university's mission of teaching, research, and service to our community.

As our enrollment continues to increase and our programs of study improve and expand, the College of Sciences continues

to develop as a major contributor to the quality of life in Southern Nevada. With President Harter's strong leadership, UNLV and the College of Sciences have added a world-class radiation chemistry team; important biogenetics scholars; leading astronomers and physicists; experts on water resources, mathematics, and science education; and acclaimed geologists. The continued growth of the College of Sciences translates into a richer, more diverse, and positive educational experience for our students and I look toward our newly-formed Advisory Board of alumni, academic, and community leaders to provide much needed support and counsel.

This fall UNLV launched its first-ever comprehensive campaign, an unprecedented project in the state of Nevada, and a wonderful indicator of our vitality and vision. All gifts and donations—whatever the amount—provide the College of Sciences with crucial funds for undergraduate and graduate scholarships, enhancements to our laboratories, and other improvements to assist our faculty and staff. To find out how you can help us as we move UNLV to the top tier of academic institutions visit: [campaign.unlv.edu](http://campaign.unlv.edu).

I appreciate your interest in the College of Sciences and look forward to hearing from you.

Sincerely,

**Ronald Yasbin  
Dean, College of Sciences**

## We Want to Hear from You

Send us your personal and career updates.

First Name \_\_\_\_\_ Last Name \_\_\_\_\_

Home Phone (\_\_\_\_) \_\_\_\_\_ Work Phone (\_\_\_\_) \_\_\_\_\_

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Degree \_\_\_\_\_ Graduation Date \_\_\_\_\_

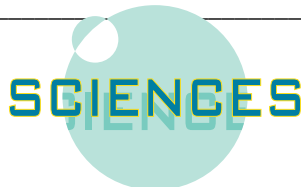
Occupation \_\_\_\_\_ Employer \_\_\_\_\_

Your News \_\_\_\_\_

\_\_\_\_\_  
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Please fax or mail this form to:

William E. Brown Jr.  
College of Sciences  
University of Nevada Las Vegas  
4505 Maryland Parkway, Box 454001  
Las Vegas, Nevada 89154-4001



## Water Conservation

*Continued from page 1*

costs.

Many of the center's research efforts involve partnerships between the center and the community and go beyond simple conservation. Through the center, Devitt and his team involve and educate residents with hopes that younger students will consider water conservation as a strong component in their futures.

"We hope to eventually tie into the Clark County School District, helping high school students get a feel for what water research is about. Hopefully some of these students can be nurtured into the science programs at UNLV," Devitt says.

## Black Mountain Kennel Club Scholarships

This local kennel club has generously funded a scholarship that supports students pursuing careers in veterinary medicine. Here are the 2005-2006 recipients:

**Stephanie Settlemyre** is a junior majoring in Biological Sciences (pre-professional emphasis). Her GPA is 3.89 and she is currently working as a veterinary technician at Blue Cross Animal Hospital in Las Vegas. Her goal is to work with wildlife at a rehabilitation clinic, focusing on the care of birds.

**Cyndi Tran** is a senior majoring in Biological Sciences. Her current GPA is 3.73. She is currently conducting laboratory research on animal genetics with Professor Deborah Hoshizaki. Her goal is to become a family pet veterinarian and open a clinic in Las Vegas.

Previous recipients include:

**Tracy Kutil** (2001-2002), who was accepted into the Colorado State University College of Veterinary Medicine and is presently completing her third year of studies.

**Jarrold Moss** (2000-2001), who also attends the Colorado State University College of Veterinary Medicine. He is currently completing his fourth year of studies and an internship in Los Angeles. Jarrod has established local connections and will be opening up a practice (or working with other veterinarians) in Las Vegas in 2006. He visited UNLV earlier this semester and has offered to be a contact point for other UNLV undergraduates interested in veterinarian medicine.

## National Science Foundation Funds Research at UNLV

With a \$250,000 grant from the National Science Foundation (NSF), assistant professors of geology Matthew S. Lachniet and Ganqing Jiang will spearhead an effort to study climatic conditions on earth, from contemporary times to hundreds of millions of years ago. The project will require a special lab and a complex piece of equipment essential to the investigation of climatic change, the evolution of life on earth, and the climate's role in society and culture. Called a stable isotope ratio mass spectrometer (SIRMS), this device can perform complex analyses on samples of stable isotopes of oxygen, carbon, and hydrogen in carbonate rocks and waters.

"Every day UNLV geoscientists are making important contributions to this university and community," says dean of

the College of Sciences Ronald Yasbin. "This project has direct implications for the quality of life here in the Las Vegas Valley."

Student participation in this research-intensive learning environment is a hallmark of the undergraduate and graduate student experience at UNLV. The project leaders will also recruit students from the UNLV Minority Science Students Program, an effort to promote the enrollment of women and minorities in the sciences, an issue of increasing national significance.

"We are very pleased that NSF has chosen to fund establishment of a stable isotope laboratory at UNLV," Lachniet says. "It will enhance learning opportunities for undergraduate and graduate students in the earth sciences and allow them access to a state-of-the-art facility."



**Patrick Drohan, assistant professor of geoscience, conducts soil research in Nevada.**

## Smithsonian Institution's Soils Exhibit 2007-2010

The key to sustaining life, the environment, and a healthy food supply is right beneath our feet. To demonstrate this, UNLV's Patrick Drohan, assistant professor of geoscience, has initiated an effort to create a soils exhibit at the prestigious Smithsonian Institution's National Museum of Natural History in Washington, DC. Scheduled to appear from 2007-2010, the Smithsonian Soils Exhibit will show how soil is intricately linked to the health of humanity, the environment, and the planet. Some six to nine million visitors each year, including a national and international audience of school children, teachers, policy makers, members of the media, and local and international visitors will view this exhibit.



**Assistant professor of geology Matthew S. Lachniet collects research samples in a cave in Bastimentos Island off the Caribbean coast of Panama to study climatic conditions on earth.**

## News from the College



This summer, doctoral biology students Cheryl Vanier and Brent Sinclair conduct research in UNLV's genomics laboratory.

## UNLV Offers Stress Genomics Expertise to Nevada

The Las Vegas Center for Stress Genomics includes a Core Use Facility to provide research equipment and expertise to support genomics services for the state of Nevada.

Carl Reiber, Ph.D. and Steven Roberts, Ph.D. direct the facility, which is located in the Department of Biological Sciences, in Juanita Greer White Hall. Alyssa Braun, Ph.D. and Frank van Breukelen, Ph.D. are the primary laboratory scientists.

The center is the only one of its kind in Southern Nevada and houses \$1.5 million worth of advanced molecular biology equipment for research related to human, animal, and plant genes. The center further affords UNLV graduate and undergraduate students the opportunity to actively enhance their classroom experiences by working in the laboratory on a major federally sponsored research project.

Established in 2002, special funding for the center was provided by both the National Science Foundation (NSF), through its Experimental Program to Stimulate Competitive Research (EPSCoR), and the National Institute of Health's Nevada Biomedical Research Infrastructure Network (NBRIN).

## Memorial Fund Honors Professor

Roberta Williams, an assistant professor of biology at UNLV who retired in 2004, passed away suddenly last May. Williams taught and mentored thousands of UNLV students and area teachers in her career. The College of Sciences has established a fund for those who wish to contribute in her honor. Your gifts will benefit the College of Sciences Student Advising Center. Please direct your donations to: Roberta Williams Memorial Fund, UNLV Foundation, Box 451006, Las Vegas, NV 89154-1006.

## Science Fair

Local students, teachers, family members, and visitors filled UNLV's North Gym with the best and brightest science minds in our region last April for the 2005 Southern Nevada Regional Science and Engineering Fair. More than 300 of the best science projects produced at area grade schools were featured. Prizes were awarded in the areas of environmental science, earth and space science, physical and mechanical science, biological and behavioral science, and technological design/inventions.

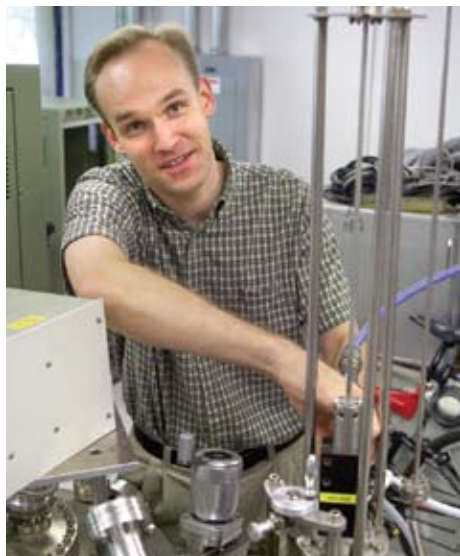
UNLV science and engineering faculty and staff were on hand with a series of educational displays and demonstrations. For more information please call the UNLV College of Sciences Advising Center at (702) 895-2077.

## Faculty Early Career Development Award

Professor Frank van Breukelen recently received a prestigious Faculty Early Career Development Award from the National Science Foundation for \$305,070 to support a project entitled "Protein Metabolism During Mammalian Hibernation." Biochemical and molecular strategies will be employed to examine the mechanisms by which protein metabolism is depressed as well as the implications of that depression. A better understanding of hibernation may have profound implications for designing therapies for cardiac dysfunction, muscle disuse atrophy, and kidney failure. Education at both undergraduate and graduate levels will be an integral part of this research. An outreach component of this grant will be a local, children's television show produced in conjunction with UNLV-TV called "Desert Survivor." This program will showcase the local flora and fauna and is designed to promote scientific literacy in the local elementary schools.



Professor Frank van Breukelen recently received the prestigious Faculty Early Career Development Award from the National Science Foundation.



**Chemistry professor Clemens Heske helps lead a team of UNLV researchers in the Colleges of Sciences and Engineering to study hydrogen storage.**

## Science Professors Take Closer Look at Hydrogen Economy

UNLV faculty, including several research groups in the chemistry and physics departments, are working with funding from the U.S. Department of Energy to develop the scientific and technological base for a “hydrogen economy.”

Chemistry professors Clemens Heske and Balakrishnan Naduvalath are leading a team of UNLV researchers in the Colleges of Sciences and Engineering to study the fundamental aspects of hydrogen storage in nanomaterials (i.e., materials in which the characteristic dimensions are between one and several hundred nanometers). Scientists have learned how to control the size and shape of a wide variety of materials at the atomic or molecular level. In particular the high surface area and peculiar arrangement of surface atoms make nanomaterials – such as carbon nanotubes – premier candidates for a high-density adsorption of hydrogen molecules, which will be required to meet the goals of sufficiently high storage capacity (e.g., to allow a car to drive 300 miles with one tank-full of hydrogen fuel).

Another hydrogen-related research project in the College of Sciences focuses

## UNLV Student Receives Prestigious Goldwater Scholarship

UNLV biology major Archana Nelliot knew from an early age that a career in the sciences would be her life’s calling. That mission got a major boost recently when she was awarded a 2005 Barry M. Goldwater Scholarship for her undergraduate research in the natural sciences, the premier undergraduate award of its type in the field.

“Archie is an extraordinarily talented young lady and it has been great fun working with her since her freshman year,” said UNLV Biology Professor Deborah Hoshizaki. “She is an outstanding student with a brilliant future, and this award is a tribute to both her hard work and dedication to research.”

Nelliot was selected in part because of her undergraduate studies in Hoshizaki’s laboratory on the biological phenomenon known as tissue dissociation—the study of which Nelliot hopes will someday lead to a greater understanding of wound healing and how cancer metastasizes. Nelliot is the only student in Nevada this year to be awarded the prestigious scholarship and one of only 310 recipients nationwide.

Established by Congress in 1986 to honor the late senator, the Barry M. Goldwater Scholarships and Excellence in Education Program seeks to provide a continuing source of highly qualified scientists, mathematicians, and engineers by awarding scholarships to college students who intend to pursue careers in those fields. Goldwater Scholarships cover the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 per year.



**Archana Nelliot was selected as a Goldwater Scholarship recipient from a field of 1,113 students nationwide.**

on the development of novel membrane materials. Advances in this field are rapidly enlarging our capabilities to restructure production processes, protect the environment and public health, and provide new technologies for sustainable energy. Membrane technologies play an increasingly important role for pollution prevention and energy production, as well as environmental monitoring, quality control, and bioseparation applications. Fuel cells may play the role of the internal combustion engine or the gas turbine as the technology develops towards a hydrogen-based economy.

Researchers from the Department of Chemistry are also involved in projects dedicated towards the photoelectrochemical production of hydrogen. In this research approach, which is conducted as part of an international collaboration, a commercial photovoltaic cell (solar cell) is used to produce the voltage necessary for water splitting while being illuminated with sunlight. This approach promises a

decentralized possibility of hydrogen production with the prospect of converting the sheer unlimited supply of solar energy into hydrogen fuel. However, the performance of current devices needs to be significantly enhanced, which requires basic insight into the properties of materials and interfaces in these cells.

The new technologies should provide the link between production and use of hydrogen in an energy chain, whether to power vehicles or as a source of power for stationary uses. The crucial and fascinating questions yet to be understood—or fully explored—concern the timescale over which the transition can take place in different countries, the leading applications, and the triggers that will enable particular areas to move toward a cleaner fuel. Additional research projects in the College of Sciences are exploring interfaces in solid-state electrolyte cells for water splitting and surface corrosion effects in thermochemical cycles for hydrogen production.

## New Appointments

**Dong-Chan Lee** (Ph.D., University of Massachusetts, Lowell) joins the Department of Chemistry from the University of Chicago, where he served as a postdoctoral research associate (2001-2004) and as a research scientist (2004-2005). His research interests include the design and synthesis of organic photovoltaic and electro-optic materials.

**Daniel Proga** (Ph.D., Nicolaus Copernicus Astronomical Center [CAMK], Warsaw, Poland) joins the Physics Department from Princeton University, where he served as a research staff member in the Department of Astrophysical Sciences. His primary research interests focus on mass accretion processes onto compact objects and related mass outflows.

**Adam C. Simon** (Ph.D., University of Maryland, College Park) joins the Geosciences Department from Johns Hopkins University, where he served as a postdoctoral fellow and lecturer in the M.K. Blaustein Department of Earth and Planetary Sciences. His primary teaching and research interests focus on geochemistry, mineralogy, and environmental geology.

## Tony Alamo Named College of Science Alumnus of the Year

The College of Sciences is pleased to name Anthony "Tony" Alamo '86 BS Chemistry as its 2005 Alumnus of the Year. He receives this award for his devotion and continuing service to UNLV.

Although born in Reno, Nev., Alamo's ties to Southern Nevada run deep.

As a young college student, Alamo served as founding member of UNLV's student ambassador program and as the undergraduate representative to the academic standards committee.

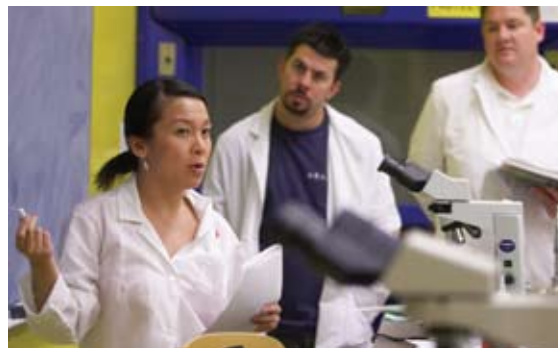
He became the first Rebel accepted to the University of Southern California's School of Medicine, where he graduated in 1991. After completing a three-year residency in Los Angeles, he returned home in 1994 to start a

Southern Nevada internal medicine practice.

As a professional, Alamo continues his support of UNLV. He recently accepted a position on the UNLV Foundation Board of Trustees and previously served as a member of the Alumni Association. His community service includes a recent appointment as chairman for the Advisory Medical Committee of the Nevada Athletic Commission.



**Tony Alamo was recently named the College of Sciences Alumnus of the Year.**



**More than 100 instructional and research faculty members in the College of Sciences teach seven undergraduate and graduate degree programs, including biological sciences, chemistry, radiation chemistry, geoscience, mathematical science, environmental sciences, and physics.**

## "How Can I Help the College of Sciences?"

Alumni and other friends support the College of Sciences through attendance at special events, gifts to specific programs, and undesignated gifts for Dean Ronald Yasbin to use as "venture capital" to support emerging needs.

These undesignated gifts are part of our annual giving program—an ongoing effort to increase yearly donations to support the College of Sciences directly. We invite you to support this vital effort through:

**Membership in the Dean's Associates Program.** The College of Sciences recently launched a new giving club to encourage and recognize donors of the college. The Dean's Associates gift club recognizes donors who give \$1,000 or more to support Dean

Ronald Yasbin's priorities. Members will stay current on college and campus news through special correspondence from President Carol C. Harter and other campus leadership, invitations to campus and community events, as well as updates through campus communications such as *UNLV Magazine* and individual college and program publications.

**Pledges through the Rebel Ring Phonathon.** Next spring, students will phone our alumni and other friends to share college and department news, and ask for support specifically for these programs. Last spring's Phonathon, in only its second year, garnered 44 new alumni donors. Thanks for showing your Rebel Pride.

### **Year-End Gifts Using the Reply Envelope.**

Your gift to the College of Sciences may benefit your 2005 tax return. Reply with your donation using the envelope included in this mailing, and along with your thank you letter, we will mail you a receipt suitable for your tax records. UNLV and the UNLV Foundation are federally-recognized 501(c)(3) organizations.

We will be pleased to recognize you for your gift through any of these programs in the spring newsletter's Donor Honor Roll. For more specific information on how your gift helps the College of Sciences, please contact William Brown at 702-895-2079 or [william.brown@ccmail.nevada.edu](mailto:william.brown@ccmail.nevada.edu).

# INVENT THE FUTURE: Science, Engineering and Technology Building

Many of the greatest advancements of our time began in university laboratories. Now, more than ever, society is relying on research, discovery, and invention to guide us through periods of social and economic transition. In response to this growing responsibility, university faculty, staff, and students are seeking new and improved ways to share information and collaborate.

Slated for completion in 2007, the new Science, Engineering and Technology (SET) Building at UNLV will allow the university to accommodate current and future student growth while providing faculty and staff the space needed for research and teaching in natural sciences, engineering, and other technology areas requiring multidisciplinary research.

“UNLV’s expanding program of scientific research demands a unique home base, designed for learning, discovery, and community engagement,” says UNLV President Carol C. Harter. “With state-of-the-art, customizable laboratories and classrooms as well as public auditorium and exhibition space, the Science, Engineering

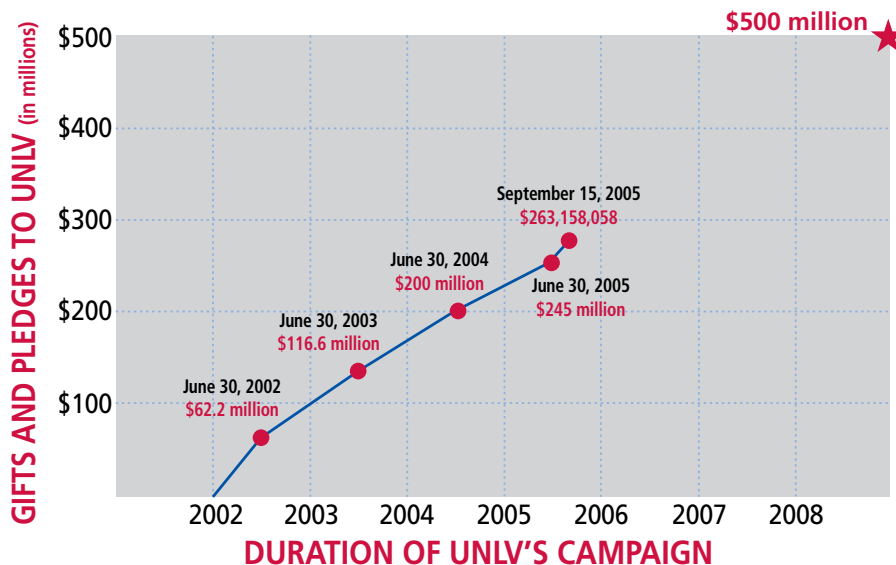
and Technology Building blends research and scholarship in the active exploration of microscopic worlds and distant universes.”

The building will offer approximately 190,000 square feet of laboratories and teaching space, “smart” conference rooms, and integrated research space that can be easily converted from one use to another. And it will allow UNLV to recruit Nevada’s best students and continue attracting the nation’s top faculty by offering them the opportunities, resources, and a research environment required to be successful in their fields.

“The SET Building is a crucial resource to support scientific research at UNLV—from exploring the wonders of the Nevada desert and unlocking the mysteries of human genetics to discovering the origins of distant galaxies—with the ultimate goal of improving the quality of life for everyone in Nevada,” Ronald Yasbin, dean of the College of Sciences, says.

## College of Sciences Campaign Funding Priorities

- Science, Engineering and Technology (SET) Building
- Mathematical Sciences and Science Center
- Center for Urban Agriculture and Water Conservation
- History of Soils Exhibit at the Smithsonian Institution, Washington DC
- Endowed Chairs and Professorships
- Undergraduate Scholarships and Graduate Student Fellowships



**Invent the Future** is UNLV’s first comprehensive effort to secure the promises of tomorrow through a \$500 million fundraising initiative. With your help, private funding for students, faculty, research, facilities, and programs will map a course for Las Vegas’ next decade.



**College of Sciences  
 Newsletter Fall 2005**

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**Scholarship  
 Support:  
 It's A Family  
 Affair**

More than half of all students who attend UNLV require financial assistance. That's why professor Satish Bhatnagar and his son UNLV alumnus Avnish Bhatnagar '89 BS Mathematics established an endowed scholarship earlier this year. Their generosity, supplemented with matching funds from the UNLV Foundation, will help students each year in the mathematics department in need of financial support to realize their dream of a college education.

**A Message from Chairperson Pat Mulroy**



**Pat Mulroy**

I am thrilled to serve as chairperson for the initial College of Sciences Advisory Board. The faculty, students, and staff of the College of Sciences are hard at work in classrooms, libraries, and research laboratories. You will also find them exploring the waterways, deserts, neighborhoods, and skies all around us. The College of Sciences provides the core science and mathematics education for all UNLV students, and offers many classes open to residents of Southern

Nevada. In addition, major research projects are underway to improve the quality of life for all Nevadans.

Important studies relating to water conservation and use, the impact of extreme temperatures on native plant and animal life, advances in human genomics and biotechnology, earthquakes and geological phenomena, radiation chemistry, and high-pressure physics are but a few areas of inquiry that promise to improve our health, safety, and security.

I look forward to working with Dean Yasbin, the Advisory Board, the faculty, students, and staff of the College of Sciences, and – most importantly – all of you who will join with us to advance the important teaching and research goals for the College of Sciences. The citizens of Las Vegas and Southern Nevada deserve the finest educational opportunities we can provide, and I am proud to support UNLV.